Claims 1-24 (Cancelled)

25. (Currently amended) A gas heating device, comprising:

at least one open chamber having a wall, said wall having a front face coated with fissile material and a rear face;

inlet means for introducing gas into the chamber; ~~and~~

outlet means for evacuating gas circulated through said chamber from the inlet means; ~~, said wall having a front face coated with fissile material arranged to expose the fissile material to a neutron flux for inducing fission and the release of fission fragments into the chamber to interact with the gas circulating through said chamber, and a rear face~~

a neutron reflector comprising a thickness of carbon material surrounding an enclosure in which said at least one chamber is located, said thickness, in cm, being at least 50/d, where d is the density of said carbon material expressed in g/cm^3; and

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means for cooling the rear face of the wall of said chamber, whereby exposure of the fissile material to a neutron flux causes fission and the release of fission fragments into the chamber to interact with the gas circulating through said chamber.

26. (Previously amended) A device according to claim 25, wherein the at least one chamber and the fissile material coating are arranged to induce fission in critical conditions.

27. (Original) A device according to claim 25, wherein the fissile material coating has a fissile content lower than 10 mg/cm^2, preferably in the range from 1 to 3 mg/cm^2.

28. (Original) A device according to claim 25, wherein the fissile material comprises ^{242m}Am as a fissile isotope.

29. (Original) A device according to claim 28, wherein the fissile material is in the form of a carbide.

30. (Withdrawn) A device according to claim 25, wherein the fissile material comprises ^{233}U, ^{235}U or ^{239}Pu as a fissile isotope.

31. (Withdrawn) A device according to claim 30, wherein the fissile material is in the form of a carbide.

32. (Cancelled)

33. (Currently amended) A device according to claim ~~32~~ 25, wherein the neutron reflector comprises carbon, beryllium or beryllium oxide.

34. (Cancelled)

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35. (Cancelled)

36. (Currently amended) A device according to claim ~~32~~ 25, wherein the neutron reflector has cavities for receiving removable neutron-absorbing control rods.

37. (Currently amended) A device according to claim ~~32~~ 25, wherein a plurality of chambers are arranged in the enclosure surrounded by the neutron reflector for receiving the heated gas.

38. (Currently amended) A device according to claim ~~32~~ 25, wherein said outlet means are in communication with an exhaust nozzle through a throat provided in the neutron reflector.

39. (Original) A device according to claim 38, wherein the enclosure has a fuel region where said at least one chamber is located, and a hot gas collecting region between the fuel region and the throat, wherein a cooling medium is circulated in a circuit having a first portion on a face of the neutron reflector adjacent to the hot gas collecting region and a second portion located in the fuel region and separated from the hot gas collecting region by

a partition having an aperture in which an open end of the coated chamber wall is inserted, and wherein the coated chamber wall separates the chamber from said second portion of the cooling circuit inside the fuel region.

40. (Previously amended) A device according to claim 39, wherein a molten metal is used as said cooling medium.

41. (Original) A device according to claim 40, wherein said molten metal comprises ^{7}Li.

42. (Original) A device according to claim 25, wherein said at least one chamber has a tubular shape.

43. (Previously amended) A device according to claim 25, wherein said inlet means comprise a porous material of which the wall of said at least one chamber is made, the gas being introduced into the chamber through pores of the porous wall material.

44. (Original) A device according to claim 43, wherein said porous material is a carbon material.

45. (Previously amended) A device according to claim 43, wherein said inlet means further comprise a gas-tight layer coated on the rear face of the chamber wall, to direct the gas introduced through the pores of the porous wall material towards the inside of the chamber.

46. (Cancelled)

47. (Previously amended) A device according to claim 25, wherein the means for cooling the chamber wall include a molten metal used as a cooling medium.

48. (Original) A device according to claim 47, wherein said molten metal comprises ^{7}Li.

49. (Currently amended) A space engine comprising~~:-~~ a gas heating device, wherein said gas heating device includes ~~including~~:

at least one chamber for containing gas, delimited by a wall having a front face coated with fissile material ~~arranged to expose the fissile material to a neutron flux for inducing fission and the release of fission fragments into the chamber,~~ and a rear face, and

means for cooling the rear face of the wall of said chamber,~~; and~~

whereby exposure of the fissile material to a neutron flux causes fission and the release of fission fragments into the chamber, the space engine further comprising means for expelling the heated gas from the chamber into space to generate thrust.

50. (Original) A space engine according to claim 49, wherein the heated gas comprises hydrogen.

51. (Withdrawn) A space engine according to claim 49, wherein the heated gas comprises at least one component selected from the group consisting of carbon dioxide, helium and argon.

52. (Previously amended) A space engine according to claim 49, wherein the at least one chamber and the fissile material coating are arranged to induce fission in critical conditions.

53. (Original) A space engine according to claim 49, wherein the fissile material coating has a fissile content lower than 10 mg/cm^2, preferably in the range from 1 to 3 mg/cm^2.

54. (Original) A space engine according to claim 49, wherein the fissile material comprises ^{242m}Am as a fissile isotope.

55. (Original) A space engine according to claim 54, wherein the fissile material is in the form of a carbide.

56. (Withdrawn) A space engine according to claim 49, wherein the fissile material comprises ^{233}U, ^{235}U or ^{239}Pu as a fissile isotope.

57. (Withdrawn) A space engine according to claim 56, wherein the fissile material is in the form of a carbide.

58. (Original) A space engine according to claim 49, further comprising a neutron reflector surrounding an enclosure in which said at least one chamber is located.

59. (Original) A space engine according to claim 58, wherein the neutron reflector comprises carbon, beryllium or beryllium oxide.

60. (Original) A space engine according to claim 58, wherein the neutron reflector comprises a thickness of carbon material surrounding the enclosure, said thickness, in cm, I being at least 50/d, where d is the density of said carbon material expressed in g/cm^3.

61. (Original) A space engine according to claim 58, wherein the neutron reflector has cavities for receiving removable neutron-absorbing control rods.

62. (Original) A space engine according to claim 58, wherein a plurality of chambers are arranged in the enclosure surrounded by the neutron reflector for receiving the heated gas.

63. (Original) A space engine according to claim 58, wherein the means for expelling the heated gas comprise an exhaust nozzle, and said at least one chamber is in communication with said exhaust nozzle through a throat provided in the neutron reflector.

64. (Original) A space engine according to claim 63, wherein the enclosure has a fuel region where the fuel region and the throat, wherein a cooling medium is circulated in a circuit having a first portion on a face of the neutron reflector adjacent to the hot gas collect- region and a second portion located in the fuel region and separated from the hot gas collecting region by a partition having an aperture in which an open end of the coated chamber wall is inserted, and wherein the coated chamber wall separates the chamber from said second portion of the cooling circuit inside the fuel region.

65. (Previously amended) A space engine according to claim 64, wherein a molten metal is used as said cooling medium.

66. (Original) A space engine according to claim 65, wherein said molten metal comprises ^{7}Li.

67. (Original) A space engine according to claim 49, wherein said at least one chamber has a tubular shape.

68. (Original) A space engine according to claim 49, wherein the wall of said at least one chamber is made of a porous material, and further comprising means for introducing the gas into the chamber through pores of the porous wall material.

69. (Original) A space engine according to claim 68, wherein said porous material is a carbon material.

70. (Previously amended) A space engine according to claim 68, wherein a gas-tight layer is coated on the rear face of the chamber wall, to direct the gas introduced through the pores of the porous wall material towards the inside of the chamber.

71. (Cancelled)

72. (Previously amended) A space engine according to claim 49, wherein the means for cooling the chamber wall include a molten metal used as a cooling medium.

73. (Original) A space engine according to claim 72, wherein said molten metal comprises ^{7}Li.

74. (New) A gas heating device, comprising:

at least one open chamber having a wall, said wall having a front face coated with fissile material comprising ^{242m}Am as a fissile isotope, and a rear face;

inlet means for introducing gas into the chamber;

outlet means for evacuating gas circulated through said chamber from the inlet means; and

means for cooling the rear face of the wall of said chamber,

whereby exposure of the fissile material to a neutron flux causes fission and the release of fission fragments into the chamber to interact with the gas circulating through said chamber.

75. (New) A device according to claim 74, wherein the at least one chamber and the fissile material coating are arranged to induce fission in critical conditions.

76. (New) A device according to claim 74, wherein the fissile material coating has a fissile content lower than 10 mg/cm^2, preferably in the range from 1 to 3 mg/cm^2.

77. (New) A device according to claim 74, wherein the fissile material is in the form of a carbide.

78. (New) A device according to claim 74, wherein said at least one chamber has a tubular shape.

79. (New) A device according to claim 74, wherein said inlet means comprise a porous material of which the wall of said at least one chamber is made, the gas being introduced into the chamber through pores of the porous wall material.

80. (New) A device according to claim 79, wherein said porous material is a carbon material.

81. (New) A device according to claim 79, wherein said inlet means further comprise a gas-tight layer coated on the rear face of the chamber wall, to direct the gas introduced through the pores of the porous wall material towards the inside of the chamber.

82. (New) A device according to claim 74, wherein the means for cooling the chamber wall include a molten metal used as a cooling medium.

83. (New) A device according to claim 74, wherein said molten metal comprises ^{7}Li.

84. (New) A gas heating device, comprising:

at least one open chamber having a wall, said wall having a front face coated with fissile material and a rear face;

inlet means for introducing gas into the chamber, comprising a porous material of which the wall of said at least one chamber is made, the gas being introduced into the chamber through pores of the porous wall material;

outlet means for evacuating gas circulated through said chamber from the inlet means; and

means for cooling the rear face of the wall of said chamber,

whereby exposure of the fissile material to a neutron flux causes fission and the release of fission fragments into the chamber to interact with the gas circulating through said chamber.

85. (New) A device according to claim 84, wherein the at least one chamber and the fissile material coating are arranged to induce fission in critical conditions.

86. (New) A device according to claim 84, wherein the fissile material coating has a fissile content lower than 10 mg/cm^2, preferably in the range from 1 to 3 mg/cm^2.

87. (New) A device according to claim 84, wherein said porous material is a carbon material.

88. (New) A device according to claim 84, wherein said inlet means further comprise a gas-tight layer coated on the rear face of the chamber wall, to direct the gas introduced through the pores of the porous wall material towards the inside of the chamber.

89. (New) A device according to claim 84, wherein the means for cooling the chamber wall include a molten metal used as a cooling medium.

90. (New) A device according to claim 89, wherein said molten metal comprises ^{7}Li.

91. (New) A gas heating device, comprising:

at least one open chamber having a wall, said wall having a front face coated with fissile material and a rear face;

inlet means for introducing gas into the chamber;

outlet means for evacuating gas circulated through said chamber from the inlet means; and

means for cooling the rear face of the wall of said chamber, including a molten metal used as a cooling medium,

whereby exposure of the fissile material to a neutron flux causes fission and the release of fission fragments into the chamber to interact with the gas circulating through said chamber.

92. (New) A device according to claim 91, wherein said molten metal comprises ^{7}Li.

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93. (New) A device according to claim 91, wherein the at least one chamber and the fissile material coating are arranged to induce fission in critical conditions.

94. (New) A device according to claim 91, wherein the fissile material coating has a fissile content lower than 10 mg/cm^2, preferably in the range from 1 to 3 mg/cm^2.